

TO: HOLDERS OF 27660 SERIES OXYGEN REGULATOR ASSEMBLY
COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

REVISION NO. 11 DATED MAY 1, 1994

HIGHLIGHTS

Chapter/Section and Page No.	Description of Change	Effectivity
Title Page	Added revision number and date.	All Models
Record of Revisions	Added revision number and date.	All Models
Service Bulletin List	Added S/B 27660-35-01	All Models
List of Effective Pages	Changed effectivity dates for all revised pages.	All Models
302	Added "identification" to para 3.C Revised wording of procedural steps 3.G	All Models
303/304	Revised wording of procedural steps 3.O and 3.P for clarity.	All Models
704	"Actuator link" was "link" in paragraphs 5.J Note, 5.I and 5.J. In para 5.J corrected actuator link callout from (180) to (220). In para 5.M corrected cap callout from (C35) to (85, 90 or 91) Added "with standard spanner wrench" to paragraph 5.K. Reworded paragraphs 5.J, 5.M, 5.N and 5.O for clarity.	All Models
705/706	Added "identification" to para 5.Q In para 5.R revised cap callout from (85 or 90)	All Models



COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

FOR :

OXYGEN REGULATOR ASSEMBLY 27660 SERIES

SCOTT®

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Retain this record in the front of the manual. On receipt of revisions, insert revised pages in the manual and enter revision number, date inserted, and initials.

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INTRODUCTION

1. Scope

This manual establishes the user maintenance, overhaul and service procedures for servicing the 27660 Series Oxygen Regulator Assemblies described herein. Dash configurations of the 27660 Series Oxygen Regulator Assemblies that are covered by this CMM are indicated below.

27660 -1/-01	27660 -7/-07	27660 -15
27660 -02	27660 -08	27660 -17
27660 -3/-03	27660 -9/-09	27660 -19
27660 -5/-05	27660 -11	27660 -21
27660 -06	27660 -13	27660 -23

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

This manual provides the following information:

- A. Specifies proper safety regulations to be followed while performing service on oxygen equipment used in aviation applications.
- B. Establishes the proper sequence of operations to be performed on the defined equipment.
- C. Provides the user with data necessary to properly maintain, check, test and repair the equipment.

2. WARNINGS

The following WARNINGS are presented to inform the user of this manual of the requirements which shall be adhered to when performing service procedures on this equipment. Additional WARNINGS will be found in the procedural steps in the manual.

WARNING: ANY SERVICE OR OVERHAUL PERFORMED ON THIS APPARATUS SHALL BE DONE ONLY BY THOSE FACILITIES EXPERIENCED IN, OR BY PERSONNEL KNOWLEDGEABLE IN, AVIATION OXYGEN EQUIPMENT. IF NONE ARE KNOWN, CONTACT SCOTT AVIATION OR ITS DISTRIBUTORS FOR NAMES OF AUTHORIZED SERVICE CENTERS.

ALL PROCEDURES DESCRIBED IN THIS MANUAL SHALL BE PERFORMED IN AN AREA FREE OF OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS. DUST, LINT, AND FINE METAL FILINGS, ARE ALSO POTENTIAL COMBUSTIBLES THAT MIGHT IGNITE, AND RESULT IN AN EXPLOSION, WHEN EXPOSED TO PRESSURIZED OXYGEN.

DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. DUST, LINT, AND FINE METAL FILINGS, ARE ALSO POTENTIAL COMBUSTIBLES THAT MIGHT IGNITE, AND RESULT IN AN EXPLOSION, WHEN EXPOSED TO PRESSURIZED OXYGEN.

DESCRIPTION AND OPERATION

1. General

This manual provides overhaul instructions with illustrated parts list for the 27660 Series Oxygen Regulator Assemblies (see Figure 1).

All regulators within the 27660 Series have identical internal construction. Refer to the Illustrated Parts List Section of this CMM for external regulator differences. Beside the external differences, pressure settings and testing procedures vary among the various dash configurations.

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

2. Purpose of Equipment

The 27660 Regulator is a pressure reducing mechanism that reduces a 2000 psi, or lower, variable oxygen source to a usable pressure for use with oxygen breathing equipment.

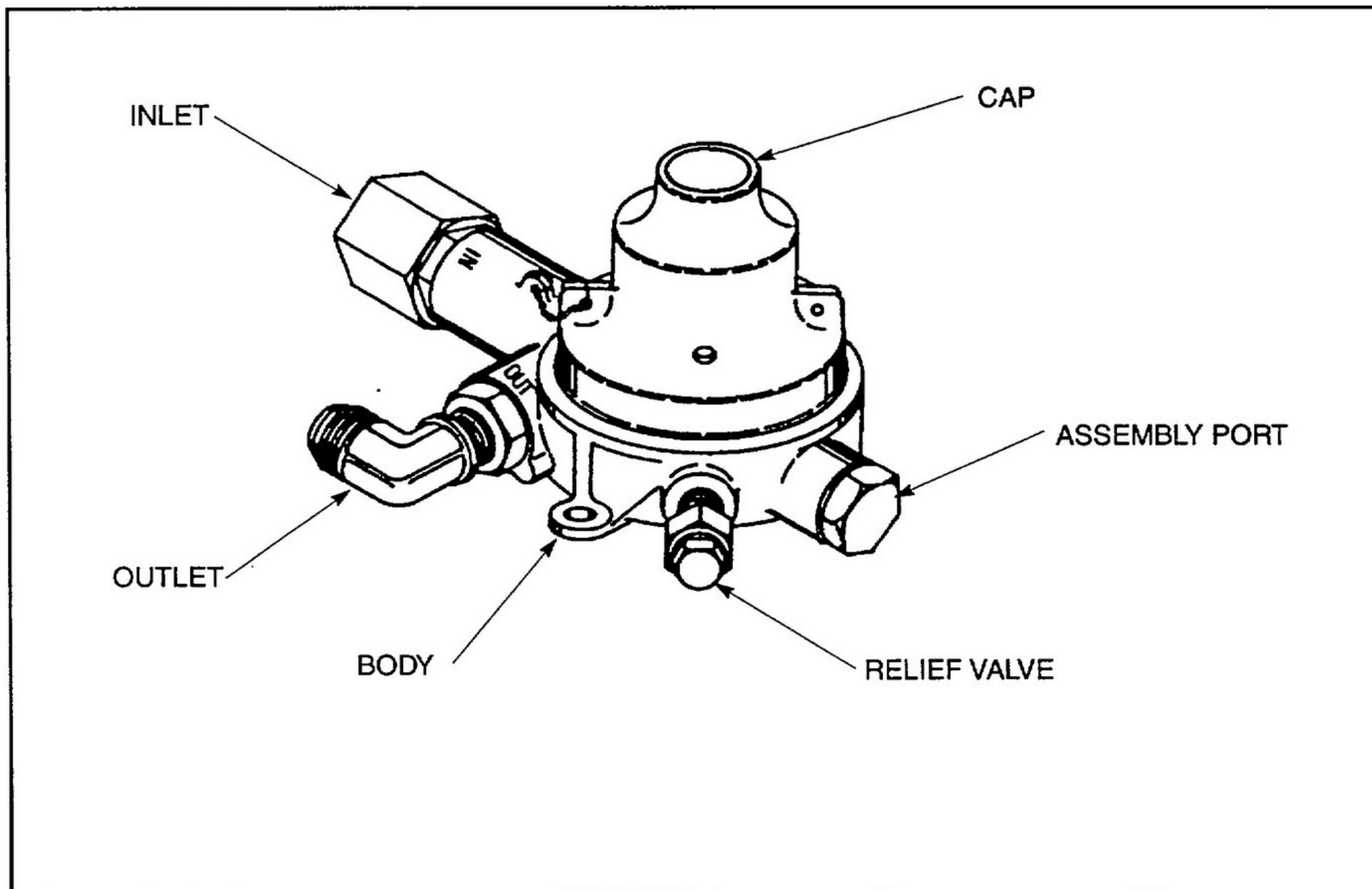


Figure 1 - Oxygen Regulator Assembly (27660 -5/-05 shown)

3. Typical Installation

A typical installation of the 27660 Series Oxygen Regulator in a pressurized control cabin is shown in Figure 2. Oxygen, which is stored at a high pressure in Cylinder (1), flows through Cylinder Valve (2) to Oxygen Regulator (3). Regulator (3) reduces the high storage pressure to a usable breathing pressure. The low pressure oxygen then flows, via Oxygen Shut-off Valve (4), to Diluter Demand Regulators (5) to the crew.

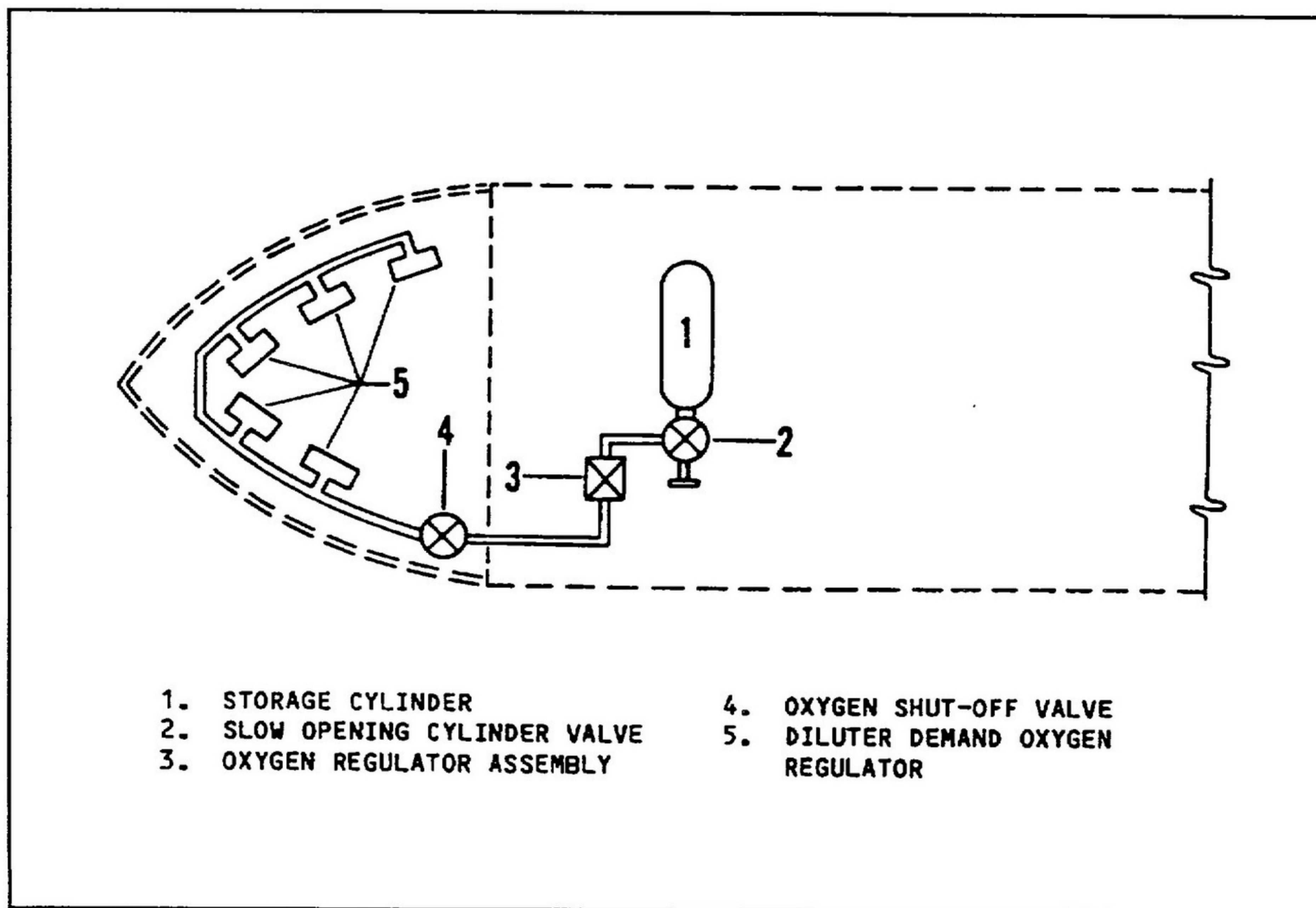


Figure 2 - Typical Installation

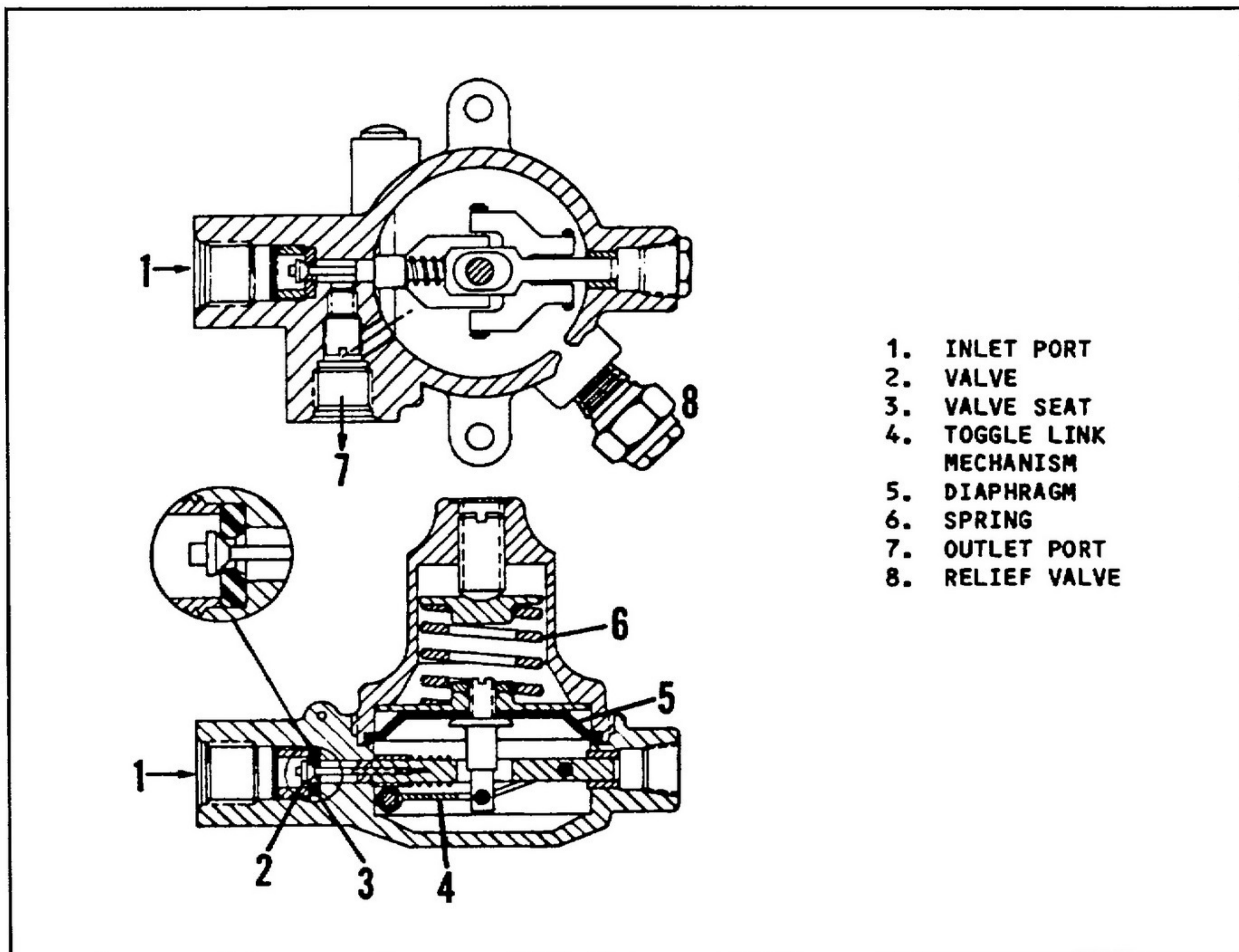


Figure 3 - Regulator Cross Section

4. Operation (See Figure 3)

High pressure oxygen enters the regulator through inlet port (1). Oxygen flow into the regulator is controlled by valve (2). Valve (2) is held against seat (3) by toggle link mechanism (4) which is maintained in the closed position by outlet pressure acting on diaphragm (5). Spring (6) force is preset and acts on the upper surface of the diaphragm. If spring force exceeds the force created by the outlet pressure acting on the diaphragm, the toggle link joint moves downward thus moving valve (2) away from its seat. This allows oxygen to flow. Flow through outlet (7) continues until outlet pressure increases sufficiently to counter-balance the spring force to close the valve. Relief valve (8) is preset to relieve at outlet pressures in excess of 100 to 110 psi, and to re-seat at reduced pressures.

TESTING AND FAULT ISOLATION

1. General

This section contains the testing and fault isolation procedures used to evaluate performance of the 27660 Series Oxygen Regulator Assemblies. Should a failure occur during testing procedures, refer to the troubleshooting chart (Table 106) for fault isolation and suggestions to remedy the problem.

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

2. Test Equipment

Test equipment required to evaluate performance of the 27660 Series Oxygen Regulator Assemblies is presented in Table 101. No special test equipment is required for testing the Oxygen Regulator Assemblies.

Table 101: Test Equipment

NOMENCLATURE	PART NO.	REFER TO PARAGRAPH
Valve - Flow Control (2 Required)	Commercially Available	5.A, 5.B, 5.C, 5.D
Flowmeter - (0-600 LPM)	Commercially Available	5.C(2), 5.D(3)
Gauge, Pressure (0-2000 psi)	Commercially Available	5.C(2), 5.C(3), 5.D(3)
Regulator, Oxygen (2 Required)	Commercially Available	5.A(2), 5.B(2), 5.B(3), 5.B(4), 5.C(1), 5.C(3), 5.D(1), 5.D(4)
Piezometer	10260-T58-1 (Scott)	5.C(2), 5.C(3), 5.D(3)
NOTE: Equivalent test equipment may be substituted.		

3. Test Materials

A list of consumable test materials is presented in Table 102. Equivalent materials may be substituted.

Table 102: Consumable Test Materials

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO PARAGRAPH
Oxygen	MIL-O-27210, Type 1	Local Vendor	All Testing
Leak Detector Solution	MIL-L-25567	V18034	5.A (3)
*Refer to Illustrated Parts List, paragraph 1.D for Vendor's Codes.			

4. Test Sequence

Unless otherwise specified, functional testing of the 27660 Series Oxygen Regulator Assemblies shall be performed in the order in which they are presented within this document.

5. Test Procedures

The test procedures described in this section require the 27660 Series Oxygen Regulator Assembly to be connected to test equipment test setup that is illustrated in Figure 101.

CAUTION: OXYGEN CONFORMING TO FEDERAL SPEC. MIL-O-27210, TYPE 1, IS USED AS THE TEST GAS WHEN PERFORMING THE TESTS OUTLINED IN THIS SECTION. IF NITROGEN OR WATER PUMPED AIR IS USED, APPROPRIATE DENSITY CORRECTION FACTORS SHALL BE APPLIED TO THE FLOW METER USED, TO CORRECT NOT ONLY THE EFFECT ON THE METER ITSELF, BUT ALSO THE EFFECT ON THE PERFORMANCE OF THE REGULATOR ASSEMBLY WITH THE LOWER DENSITY GAS. ALL FLOWS ARE NOTED IN LPM (NTPD).

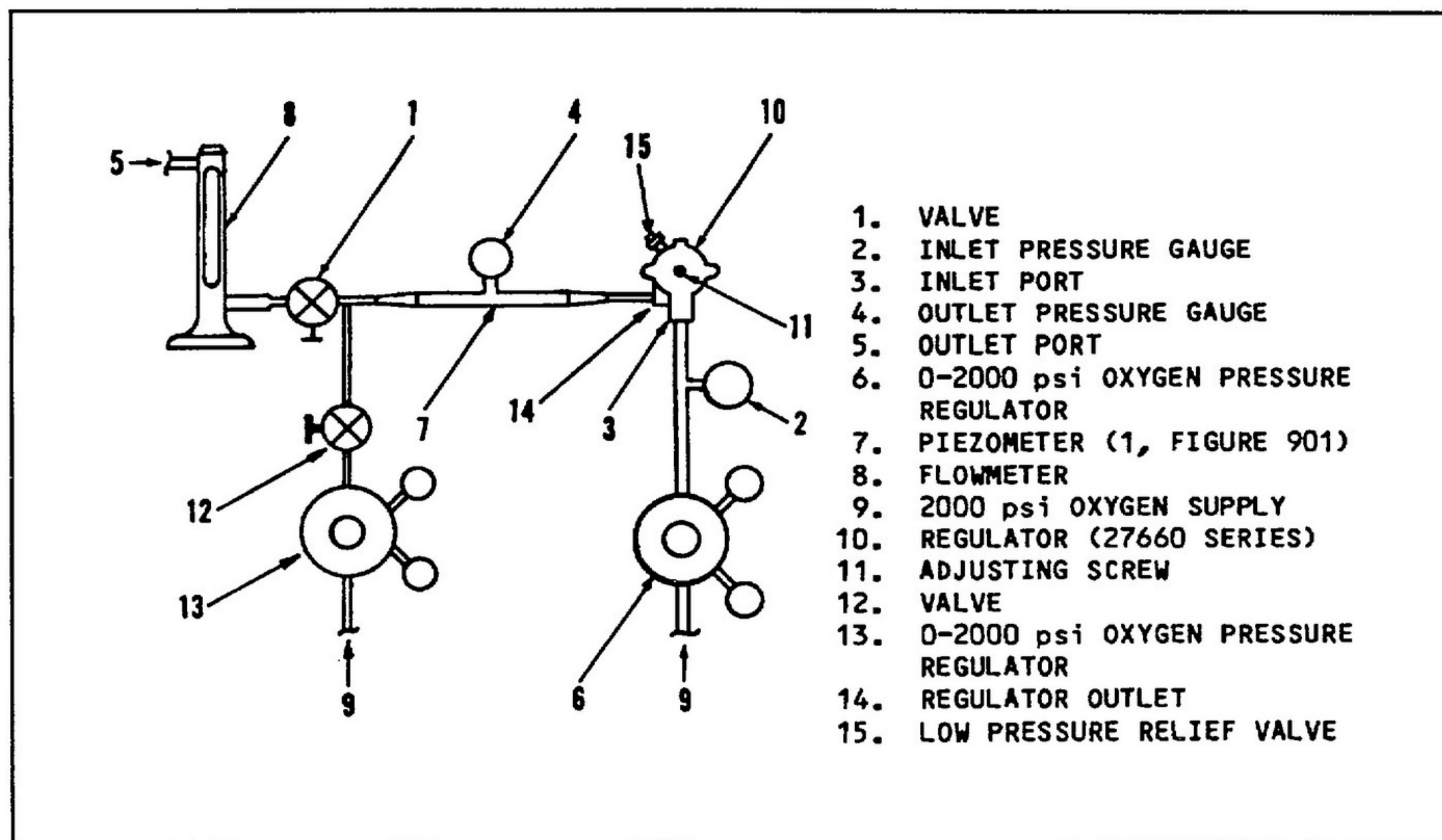


Figure 101 Test Set-up

5. Test Procedures (Continued)

A. External Leak Test

NOTE: Be certain low pressure relief valve (15, Figure 101) is installed in the regulator assembly.

- (1) Plug outlet port (14) of regulator being tested.
- (2) Adjust oxygen regulator (6) to apply the inlet pressures (listed in Table 103) to the regulator being tested.
- (3) Apply leak test solution around head of screw (185, IPL Figure 1), plug (260), relief valve (270 or 270A), hole in cap (85 or 90), where cap (85, 90 or 91) and body assembly (275 or 280) thread together, and at connection of nipple (140) to body assembly (275 or 280). No leakage is allowed.
- (4) Relieve pressure in the test setup; remove plug from regulator outlet port (14). Blow the regulator clean and dry with oil-free air.

Table 103: External Leak Test (Inlet Pressures)

REGULATOR ASSEMBLY PART No. 27660-__ __	INLET PRESSURE	
	PSIG	MPa
-1/-01, -02, -3/-03, -5/-05, -06, -7/-07, -08, -9/-09, -15, -19, -21	1800 150	12.41 1.03
-11	600	4.12
-13	1800 640	12.41 4.41
-17	1850 160	12.8 1.10
-23	2000 150	13.8 1.03

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

Table 104: Regulation Check Set-up Pressures

REGULATOR ASSEMBLY PART No. 27660-__ __	INLET PRESSURE		ADJUSTED OUTLET PRESSURE	
	PSIG	MPa	PSIG	MPa
-1/-01, -02, -3/-03, -5/-05, -06, -7/-07, -08, -15, -19, -21	150	1.03	70-75	0.48-0.52
-9/-09	150	1.03	60-65	0.41-0.45
-11	300	2.06	48-55	0.32-0.33
-13	640	4.41	75 Max.	0.52 Max.
-17	160	1.10	90-94	0.62-0.65
-23	150	1.03	90-94	0.62-0.65

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

5. Test Procedures (Continued)

B. Relief Valve Test

NOTE: Relief valve (270 or 270A, IPL Figure 1) may be tested separately prior to installation in the unit.

- (1) Plug inlet port (3, Figure 101) of regulator being tested; close valve (1).
- (2) With valve (12) closed, adjust oxygen regulator (13) to apply 100 psig (0.69 MPa), 120 psig (0.83 MPa) for 27660 -17 and -23 regulators. Slowly open valve (12) to apply set pressure to regulator outlet port (14). Relief valve shall hold this pressure.
- (3) Using oxygen regulator (13) increase applied pressure to 110 psig (0.76 MPa), 130 psig (0.90 MPa) for 27660-17 and -23 regulators. Relief valve shall open and flow between 100-110 psig, (0.69 - 0.76 MPa), between 120-130 psig (0.83 - 0.90 MPa) for 27660-17 and -23.
- (4) Using oxygen regulator (13) reduce pressure to 90 psig (0.63 MPa), 110 psig (0.70 MPa) for 27660-17 and -23. Relief valve shall have reseated and hold pressure at 90 psig (0.63 MPa) minimum, 110 psig (0.76 MPa) minimum for 27660-17 and -23.
- (5) Close valve (12) and relieve test pressure using valve (1).

C. Regulation Check

- (1) With valve (1, Figure 101) closed, apply inlet pressures listed in Table 104 to the regulator under test. Adjust for proper outlet pressure indication (see Table 104) on pressure gauge (4) using adjusting screw (11).
- (2) Open valve (1) to allow a flow of 2 SLPM (10 SLPM on -13 units) as indicated on flowmeter (8). The regulated pressure indication on gauge (4) shall not drop more than 8 psig (0.055 MPa) for all units except the -11 and -13. For -11 units, the regulated pressure shall be between 48-55 psig (0.32 - 0.33 MPa); for -13 units the regulated pressure shall be 50 psig (0.345 MPa).
- (3) Apply the inlet pressures listed in Table 105 while adjusting valve (1) to obtain the specified flows as indicated on flowmeter (8). The allowable regulated pressure indicated on gauge (4) shall be within the ranges listed in Table 105 for the particular regulator assembly being tested.

Table 105: Regulation Check Pressure/Flow Values

REGULATOR UNDER TEST PART No.27660-__	FLOW SLPM	INLET PRESSURE	ALLOWABLE REGULATED PRESSURE		INLET PRESSURE	ALLOWABLE REGULATED PRESSURE	
			PSIG	MPa		PSIG	MPa
-1/-01, -02, -3/-03, -5/-05, -06	100	150 PSIG (1.03 MPa)	50-75	0.34-0.52	1800 PSIG (12.41 MPa)	50-75	0.34-0.52
	200		50-75	0.34-0.52		50-75	0.34-0.52
	300		50-75	0.34-0.52		50-75	0.34-0.52
	400		42-75	0.29-0.52		50-75	0.34-0.52
	500		35-75	0.24-0.52		50-75	0.34-0.52
	0		65-75	0.45-0.52		60-75	0.41-0.52
-7/-07, -08, -1-19, -21	100		60-85	0.41-0.59		60-85	0.41-0.59
	200		60-85	0.41-0.59		60-85	0.41-0.59
	300		60-85	0.41-0.59		60-85	0.41-0.59
	400		50-85	0.34-0.59		60-85	0.41-0.59
	500		45-85	0.31-0.59		60-85	0.41-0.59
	0		75-85	0.52-0.59		70-85	0.48-0.59
-9/-09	100		40-65	0.28-0.45		40-65	0.28-0.45
	200		40-65	0.28-0.45		40-65	0.28-0.45
	300		40-65	0.28-0.45		40-65	0.28-0.45
	400		35-65	0.24-0.45		40-65	0.28-0.45
	500		27-65	0.19-0.45		40-65	0.28-0.45
	0		45-65	0.31-0.45		45-65	0.31-0.45
-17	2	160 PSIG (1.10 MPa)	74-94	0.51-0.65	1850 PSIG (12.8 MPa)	74-94	0.51-0.65
	20		74-94	0.51-0.65		74-94	0.51-0.65
	100		74-94	0.51-0.65		74-94	0.51-0.65
	180		74-94	0.51-0.65		74-94	0.51-0.65
	300		70-94	0.48-0.65		70-94	0.48-0.65
	0		74-94	0.51-0.65		74-94	0.51-0.65
-11	60	250 PSIG (1.72 MPa)	48-55	0.33-0.38	300 PSIG (2.06 MPa)	48-55	0.33-0.38
	0		60 Max.	0.41 Max.		60 Max.	0.41 Max.
-13	5-20	640 PSIG (1.10 MPa)	40-60	0.28-0.41	N/A	N/A	N/A
	0		75 Max.	0.52 Max.		N/A	N/A
-23	2	150 PSIG (1.03 MPa)	70-94	0.48-0.65	2000 PSIG (13.8 MPa)	70-94	0.48-0.65
	20		70-94	0.48-0.65		70-94	0.48-0.65
	100		70-94	0.48-0.65		70-94	0.48-0.65
	180		70-94	0.48-0.65		70-94	0.48-0.65
	300		70-94	0.48-0.65		70-94	0.48-0.65
	0		70-94	0.48-0.65		70-94	0.48-0.65

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

5. Test Procedures (Continued)

D. Internal Leak Test

- (1) With valve (1, Figure 101) in the "off" position, apply the lower of the pressures listed in Table 106 to inlet port (3) of the regulator under test.
- (2) Slightly open and slowly close valve (1) to allow the outlet pressure indication on gauge (4) to stabilize.
- (3) There shall be no leakage; as indicated by a pressure increase on gauge (4), during a ten-minute period (two minutes for -13 units).
- (4) Apply the higher of the inlet pressures listed in Table 106 and repeat steps (2) and (3) above.

Table 106: Internal Leak Test (Inlet Pressures)

REGULATOR ASSEMBLY PART No. 27660-__ __	INLET PRESSURE	
	PSIG	MPa
-1/-01, -02, -3/-03, -5/-05, -06, -7/-07, -08, -9/-09, -15, -19, -21	150 1800	1.03 12.41
-11	250 300	1.72 2.06
-13	640	4.41
-17	160 1850	1.10 12.8
-23	150 2000	1.03 13.8

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

E. Shelf Storage Test

- (1) Suitably store the regulator in accordance with "Storage Instructions" provided in the Assembly Section of this document. Store unit for a minimum of 48 hours.
- (2) Repeat test procedures 5.A, 5.B, 5.C and 5.D.

6. Fault Isolation

See Troubleshooting Chart (Table 107) for fault isolation of the 27660 Series Oxygen Regulator Assemblies.

Table 107: Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	REMEDY
Leakage at fitting(s)	Loose or damaged fitting(s)	Tighten or replace
After adjustment, outlet pressure creeps	Seat (175, IPL Figure 1) dirty, scored or leaking	Clean or replace
	Valve (165) bent or scratched	Replace
	Retainer (170) loose	Tighten
Outlet pressure cannot be regulated (outlet pressure follows inlet pressure)	Damaged diaphragm (120) or (125)	Replace
	Links (215) and/or (230) not operating freely	Disassemble, clean and re-assemble
Unable to adjust regulator for desired output at flow	Valve (165) not adjusted properly	Adjust valve
Outlet pressure fluctuates at flow	Links (215) and/or (230) not operating freely	Disassemble linkage assembly, inspect for burrs; clean and re-assemble

DISASSEMBLY

1. General

This section describes the equipment and procedures necessary for disassembly of the 27660 Series Oxygen Regulator Assemblies. Most repair procedures do not require complete disassembly of the regulator. Disassemble units only to level necessary, as determined in Testing and Fault Isolation, to access suspect components.

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

2. Special Tools and Equipment

A list of special tools and/or equipment required for disassembly of the 27660 Series Oxygen Regulator Assemblies is presented in Table 301. Entries in the "ITEM NO." column refer to the tool illustrations presented in Figure 901.

Table 301: Special Tools and/or Equipment

ITEM NO.	PART NUMBER	PART NAME	APPLICATION
2	10260-T91-2	Open-end Wrench	Used to install / remove nut (180, IPL Figure 1)
3	10260-T91-3	Pliers	Used to depress spring (200, IPL Fig. 1) during installation/removal of spacer (130)
4	27660-T52-1	Spanner Wrench	Used to install / remove cap (85, 90 or 91, IPL Figure 1)
N/A	2-56NC-2B (2-inches long)	Machine Screw (used as an extractor)	Used to remove pin (195, IPL Figure 1)

3. Disassembly

WARNING: TOOLS USED FOR MAINTENANCE / SERVICE OF OXYGEN RELATED EQUIPMENT SHALL BE CLEAN AND FREE OF CONTAMINANTS.

NOTE: Prior to disassembling a 27660 regulator, note the part number and determine the parts applicable to that assembly (refer to "EFFECT CODE" column of the Illustrated Parts List). Disregard any instructions that do not apply to the particular assembly being overhauled.

A. Cut and remove lockwire, then remove nameplate (60, IPL Figure 1) to gain access to screw (65 or 70).

B. Back out screw (65 or 70).

I C. If necessary, remove identification plate (75) from cap (85, 90 or 91) by removing screws (80).

D. Unthread cap (85, 90 or 91) using spanner wrench (4, Figure 901). Use care not to damage cap.

E. Remove guide (95, IPL Figure 1) and spring (100 or 100A).

F. Unthread nut (105) and remove plate (110) by turning with thumbs.

NOTE: If plate (110) will not come loose, a standard spanner wrench may be used for removal of the plate.

I G. Remove diaphragm assembly (125) or ring (115) and diaphragm (120) .

H. Remove spacer (130) using pliers (3, Figure 901) to depress spring (200, IPL Figure 1).

J. Remove nuts (135 and 145), nipple (140), ring (150) and packing (155) from body assembly (275 or 280).

K. Remove and discard filter (160) from body assembly (275 or 280). Loosen nut (180) by turning it counterclockwise using open end wrench (2, Figure 901). Remove valve (165, IPL Figure 1) from body assembly (275 or 280).

L. Back out retainer (170) and remove seat (175).

M. Remove nut (180) using wrench (2, Figure 901).

3. Disassembly (Continued)

N. Remove screw (185, IPL Figure 1) and gasket (190). Remove pin (195) by using a No. 2-56NC-2B x 2-inch long machine screw as an extractor. Insert screw into pin and withdraw screw and pin from body.

O. Using your fingers, grip actuator link (220) and CAREFULLY lift linkage arrangement from regulator body (275 or 280); remove spring (200) from shaft (235).

P. Disassemble linkage arrangement as follows:

(1) Remove retaining ring (205) from end of pin (225) and remove pin. Forward toggle link (230) and actuator link (220) are now free for removal.

(2) Separate rear toggle link (215) from shaft (235) by removing retaining ring (205) from end of pin (210) and removing pin.

Q. Remove elbow (240), nut (245) and packing (250) from body assembly (275 or 280).

NOTE: Note orientation of elbow during removal to ensure proper orientation upon re-assembly.

R. Remove tube (255).

S. Unthread and remove plug (260), packing (265) and valve (270 or 270A) from body assembly (275 or 280).

CLEANING

1. General

This section contains information regarding the equipment and procedures required for cleaning of the 27660 Series Oxygen Regulator Assemblies. Prior to cleaning, units shall be disassembled in accordance with the Disassembly section of this document.

2. Safety

WARNING: SUITABLE EYE PROTECTION SHALL BE WORN DURING CLEANING PROCEDURES TO PREVENT EYE INJURIES.

WHEN USING CLEANING SOLVENTS, AVOID PROLONGED OR REPEATED CONTACT WITH SKIN AND INHALATION OF TOXIC VAPORS.

CLEANING PROCEDURES SHALL ONLY BE PERFORMED IN AN APPROVED CLEANING CABINET, OR IN A WELL VENTILATED ROOM OR AREA.

DO NOT USE SOLVENTS NEAR OPEN FLAMES, OR IN AREAS WHERE HIGH TEMPERATURES PREVAIL.

DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. DUST, LINT, AND FINE METAL FILINGS, ARE ALSO POTENTIAL COMBUSTIBLES THAT MIGHT IGNITE, AND RESULT IN AN EXPLOSION, WHEN EXPOSED TO PRESSURIZED OXYGEN.

3. Cleaning Materials

A list of cleaning materials is presented in Table 401. Equivalent materials may be substituted.

Table 401: Cleaning Materials

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO PARA.
Cleaner	Nonionic detergent, Type I (MIL-D-16791)	Commercially Available	6
Degreasing Agent	Trichlorotrifluoroethane (MIL-C-81302)	V72658	5
	- OR -		
	1,1-Dichloro-1-fluoroethane	V72658	5
*Refer to Illustrated Parts List, paragraph I.D for Vendor's Codes			

4. Cleaning Procedures

Cleaning procedures are divided into two categories: metallic components and non-metallic components. Cleaning procedures for each category are presented below.

5. Metallic Components

Clean metallic components using a vapor degreasing method with degreaser agents specified in Table 401. Dry components with clean, dry (oil-free) air. Hydrocarbon contamination shall not exceed 1.0 mg. per square foot.

6. Non-Metallic Components

Clean non-metallic components using an ultrasonic detergent and water cleaning system. Parts shall be completely rinsed with clear water, and dried using clean, dry (oil-free) air. Hydrocarbon contamination shall not exceed 1.0 mg. per square foot.

CHECK

1. General

Following disassembly and cleaning procedures described in preceding sections of this document, all cylinder and valve assembly components shall be checked prior to use in reassembly. If doubt exists about serviceability of a part, replace it.

NOTE: Do not examine o-rings, packings and seals. These items shall be replaced each time they are removed during disassembly.

2. Regulator Components

Check regulator components as indicated below:

A. Visually inspect all surfaces and threaded areas for evidence of damage, contamination, galling, burrs, excessive wear and corrosion.

NOTE: Excessive wear shall be defined as any obvious deformation, or deterioration of a part, which may render the unit inoperative or beyond operational limits.

B. Visually inspect all packing sealing surfaces for scratches or other obvious damage that may impair valve operation.

REPAIR

1. General

This section defines the scope of repair procedures that shall be performed with respect to the 27660 Series Oxygen Regulator Assemblies. Prior to repair, components shall have been evaluated in accordance with the Check section of this document.

2. Regulator Components

Regulator repair shall be limited to only those activities below:

- A. Cleaning
- B. Burr removal
- C. Thread chasing
- D. Replacement of cracked, bent, broken, scored, or otherwise defective components.
- E. Replacement of any gasket, seal, packing, o-ring or filter, when removed during disassembly.

ASSEMBLY

1. General

This section describes the equipment and procedures necessary for assembly of the 27660 Series Oxygen Regulator Assemblies.

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

2. Special Tools and Equipment

A list of special tools and/or equipment required for assembly of the 27660 Series Oxygen Regulator Assemblies is presented in Table 701. Entries in the "ITEM NO." column refer to the tool illustrations presented in Figure 901. Equivalent tools and/or equipment may be substituted for the listed items.

WARNING: TOOLS USED FOR MAINTENANCE/SERVICE OF OXYGEN RELATED EQUIPMENT SHALL BE CLEAN AND FREE OF CONTAMINANTS.

Table 701: Special Tools and/or Equipment

ITEM NO.	PART NUMBER	PART NAME	APPLICATION
2	10260-T91-2	Open-end Wrench	Used to install / remove nut (180, IPL Figure 1)
3	10260-T91-3	Pliers	Used to depress spring (200, IPL Fig. 1) during installation/removal of spacer (130)
4	27660-T52-1	Spanner Wrench	Used to install / remove cap (85, 90 or 91, IPL Figure 1)
4	27660-T70	Link Positioning Gauge	Used to adjust position of links (215 and 230, IPL Figure 1)

3. Assembly Materials

A list of consumable materials, required for assembly of the 27660 Series Oxygen Regulator Assemblies, is provided in Table 702.

Table 702: Consumable Assembly Materials

MATERIAL	DESCRIPTION	MANUFACTURER*	REFERTO PARA.
Sealing Tape	Permacel Tape No. 412	V99742	5.A
Oxygen Lubricant	Krytox 240 AC	V18873	4.B
Lockwire	MS20995C20	Commercially Available	6.Q, 7.P
*Refer to Illustrated Parts List, Paragraph 1.D for Vendor's Codes.			

4. Pre-Assembly Requirements

- A. All components, that are to be used in assembly of the 27660 Series Oxygen Regulator Assemblies, shall have been cleaned and checked in accordance with preceding sections of this document.
- B. Unless otherwise noted, all packings, seals and o-rings shall be lubricated with a thin film of Krytox 240 AC Lubricant, prior to installation.

5. Assembly Procedures

NOTE: Not all assembly procedures are required for each valve configuration. Refer to the "EFF CODE" column of the Illustrated Parts List to determine components used on valve configuration being assembled.

A. Wrap 1-1/2 turns of thread sealing tape to valve (270 or 270A) in the direction of the thread spiral, beginning with the first thread. In no case shall the tape extend beyond the first thread. Trim off excess tape. Install valve in body assembly (275 or 280); torque valve to **30-40 IN LBS (3.4-4.5 Nm)**.

NOTE: Tape shall be applied in accordance with MIL-T-27730.

B. Thread tube (255) into body assembly (275 or 280). Tighten the tube until it bottoms in the body.

C. Assemble links (215, 220 and 230) and shaft (235) by joining links (215 and 230) and then placing link (220) through shaft (235) so that pin (225) may be installed to unite these four parts. Secure link (215) to shaft (235) by inserting pin (210), then install four rings (205).

D. Position spring (200) on shaft (235), then place the unit assembled in step C into the regulator body assembly and secure this unit by inserting pin (195). Install gasket (190) and screw (185) to secure pin (195); torque screw to **40-50 IN LBS (4.5-5.7 Nm)**.

E. Slide seat (175) on valve (165) and thread nut (180) on valve (165) until approximately 3/16 inch of thread is exposed coming out of nut (180).

NOTE: Refer to enlarged view of items (2 and 3, Figure 3) for proper installation of seat (175, IPL Figure 1) on valve (165).

F. Place the unit assembled in step E into the inlet port of the regulator body assembly and finger tighten this unit into shaft (235) until valve (165) just bottoms on seat (175). Install retainer (170); torque retainer to **35-40 IN LBS (4.0-4.5 Nm)**.

G. Place link positioning gauge (5, Figure 901) on shoulder of case just inside threaded area; position gauge so that pin rests on joint of link (215, IPL Figure 1) near center of case. Note position of pin in relation to bar of gauge; back out valve (165) until top of pin is flush with bar.

5. Assembly Procedures (Continued)

H. Remove the gauge and tighten nut (180) against shaft (235) using open end wrench (2, Figure 901). Recheck indication of gauge after tightening nut.

I. Compress spring (200, IPL Figure 1) and press spacer (130) into place using pliers (3, figure 901). Check that spacer is secure and maintains the spring in a compressed position.

NOTE: Manually depress actuator link (220, IPL Figure 1) and note movement of shaft (235) toward the regulator inlet. The linkage parts must move freely without binding or excessive play.

J. Install diaphragm assembly (125) on actuator link (220). The hub protruding from the underside of diaphragm assembly must fully seat in the recess of the actuator link. SPARINGLY apply a thin film of oxygen lubricant to the flat underside surface of plate (110); thread plate (110) onto actuator link (220) finger-tight. Underside of plate (110) must contact the top surface of diaphragm assembly (125); diaphragm shall not bulge, pucker, or otherwise be deformed.

NOTE: Diaphragm (125) replaced diaphragm (120) and ring (115) used on some older units. Refer to Repair.

K. While holding plate (110) firmly with a standard spanner wrench, install nut (105) on actuator link (220); torque nut to **35 IN LBS (4.0 Nm)**.

L. Place spring (100) onto plate (110), and place guide (95) on spring (100 or 100A). Boss of guide (95) must fit into spring.

M. SPARINGLY apply oxygen lubricant to threads of screw (65 or 70); install screw into cap (85, 90 or 91). Thread screw downward until top of screw is approximately flush on inside of cap.

N. Align diaphragm assembly (125) so that it is concentric with regulator body. SPARINGLY apply a thin film of oxygen lubricant to the metal ring of diaphragm. Thread cap (85, 90 or 91) into regulator body (275 or 280) using spanner wrench (4, figure 901). When properly installed, all threads of the cap will be below top of regulator body.

O. SPARINGLY apply a thin film of oxygen lubricant to packing (265); install packing on plug (260). Install plug in regulator body (275 or 280).

5. Assembly Procedures (Continued)

P. Test the partially assembled regulator in accordance with the Testing Section of this CMM.

Q. Secure identification plate (75) to cap (85, 90 or 91) with screws (80).

R. Attach nameplate (60) to cap (85, 90 or 91) and lockwire the cap to the regulator body per the applicable instructions of MS 33540.

S. Place nipple (140) into nut (145); torque nut to **300 IN LBS (33.9 Nm)**. SPARINGLY lubricate the internal threads of nut (135) with oxygen lubricant and thread the nut onto nipple (140). SPARINGLY lubricate ring (150) with oxygen lubricant and place the ring against nut (135). Position packing (155) on ring (150) after lubricating the packing SPARINGLY with oxygen lubricant. Press filter (160) into regulator inlet port and then thread nipple (140) into port. Secure nipple and then tighten nut (135) against regulator body (275 or 280).

T. Thread nut (245) onto elbow (240) and place packing (250) against nut (245) after lubricating the packing SPARINGLY with oxygen lubricant. Thread elbow (240) into regulator outlet port and secure nut (245) against regulator body.

6. Storage Instructions

A. Seal all ports to prevent foreign matter from entering the valve. Store in sealed polyethylene or polyvinyl bag.

B. DO NOT use preservative coating on the regulator assembly.

FITS AND CLEARANCES

Torque values, critical to the assembly and operation of the 27660 Series Oxygen Regulator Assemblies, are listed in Table 801.

Table 801: Torque Values

IPL REFERENCE (Figure 1) ITEM No.	NOMENCLATURE	TORQUE VALUES	
		U.S.	METRIC (Nm)
105	Nut	35 IN LBS	4.0
145	Nut	300 IN LBS	33.9
170	Retainer, Seat	35 - 40 IN LBS	4.0 - 4.5
185	Screw	40 - 50 IN LBS	4.5 - 5.7
270/270A	Relief Valve	30 - 40 IN LBS	3.4 - 4.5

SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT

Special test equipment required for testing of the 27660 Series Oxygen Regulator Assemblies are presented in Table 901. Special tools and/or equipment required for assembly/disassembly of the Oxygen Regulator Assemblies are listed in Table 902. Figure 901 illustrates some of the special tools test equipment listed in Tables 901 and 902.

Table 901: Test Equipment

NOMENCLATURE	PART NO.	REFER TO PARAGRAPH
Valve - Flow Control (2 Required)	Commercially Available	5.A, 5.B, 5.C, 5.D
Flowmeter - (0-600 LPM)	Commercially Available	5.C(2), 5.D(3)
Gauge, Pressure (0-2000 psi)	Commercially Available	5.C(2), 5.C(3), 5.D(3)
Regulator, Oxygen (2 Required)	Commercially Available	5.A(2), 5.B(2), 5.B(3), 5.B(4), 5.C(1), 5.C(3), 5.D(1), 5.D(4)
Piezometer (1, Figure 901)	10260-T58-1 (Scott)	5.C(2), 5.C(3), 5.D(3)
NOTE: Equivalent test equipment may be substituted.		

Table 902: Special Tools and/or Equipment

ITEM NO.	PART NUMBER	PART NAME	APPLICATION
2	10260-T91-2	Open-end Wrench	Used to install / remove nut (180, IPL Figure 1)
3	10260-T91-3	Pliers	Used to depress spring (200, IPL Fig. 1) during installation/removal of spacer (130)
4	27660-T52-1	Spanner Wrench	Used to install / remove cap (85, 90 or 91, IPL Figure 1)
5	27660-T70	Link Positioning Gauge	Used to adjust position of links (215 and 230, IPL Fig- ure 1)

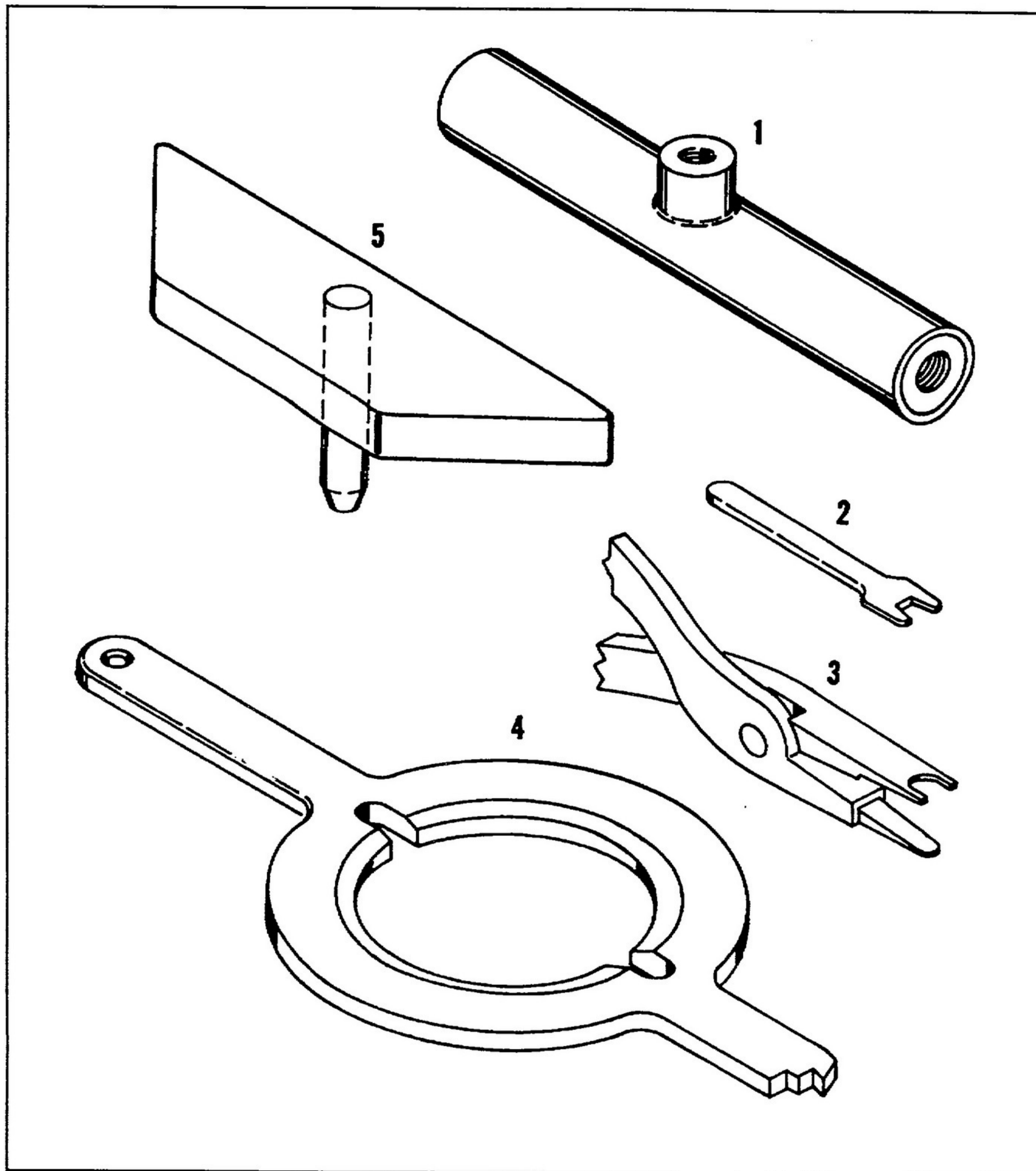


Figure 901: Special Tools and Test Equipment

ILLUSTRATED PARTS LIST

1. This Illustrated Parts List lists and describes the parts for the 27660 Series Oxygen Regulator Assemblies.
 - A. The Illustrated Parts List consists of parts listings and completely indexed drawings. The particular oxygen regulator assemblies are followed immediately by their component parts, properly indented thereunder, to show their relationship to the assembly.
 - B. The quantities listed in the "UNITS PER ASSY" column are, in the case of assemblies, the total quantity used per cylinder assembly at the location indicated, while the component parts indented under the assemblies are the quantity used per assembly. The quantities specified, therefore, are not necessarily the total used per cylinder assembly.
 - C. The part numbers listed in the "PART NUMBER" column are Scott Aviation part numbers except standard parts, which are listed by "MS" and "AN" part numbers, and vendor items, which are listed by vendor part numbers.
 - D. A six place code, following the description of a part, indicates the manufacturer of that part. Standard parts and parts carried under Scott part numbers have no vendor's code. The following list contains the codes, and names and addresses of manufacturers supplying items or articles for the oxygen regulator assemblies. This listing includes the vendor codes presented in Tables 102, 401, 702, and the parts lists contained in this section.

VENDOR CODES

<u>CODE</u>	<u>NAME AND ADDRESS</u>
V05939	Fluron Mechanical Seal Division Los Alamitos, California
V05972	Loctite Corporation Newington, Connecticut
V09055	Bal-Seal Engineering Company LaHabra, California

VENDOR CODES - (Continued)

<u>CODE</u>	<u>NAME AND ADDRESS</u>
V18873	E.I. DuPont DeNemours & Co., Inc. Wilmington, Delaware
V44389	Oakite Products, Inc. Serkely Heights, New Jersey
V50398	Enviropak, Inc. El Segundo, California
V58943	Structural Composites Industries, Inc. Azusa, California
V70829	J.T. Baker Chemical Company North Phillipsburg, New Jersey
V91784	Hooker Chemical Corporation Niagara Falls, New York
V72658	Allied Signal Corporation Morristown, New Jersey
V82682	Tempil Div. of Big Three Industries South Plainfield, New Jersey
V94499	Dow Corning Corporation Trumbull, Connecticut
V99742	Johnson and Johnson, Inc. Permacel Division New Brunswick, New Jersey

2. How to use this Illustrated Parts List

- A. If neither the part number nor the nomenclature is known, the part can be found by comparison with the exploded view illustration. When located on the illustration, the index number will refer to the line in the Illustrated Parts List with the part number and the nomenclature.

3. How to determine the applicable "EFFECT CODE"

- A. Parts used on only one part number oxygen regulator assembly (see IPL Figure 1) are indicated by a letter symbol immediately following the description of a part in the "EFFECT CODE" column. An explanation of the letter symbols used is outlined below in Table 1001. A blank "EFFECT CODE" column following a part number indicates that the list part is common to all regulator assemblies.

Table 1001: Effectivity Codes

<u>Part Number</u>	<u>"EFFECT CODE"</u>
*27660-01	A
27660-02	B
*27660-03	C
*27660-05	D
27660-06	E
*27660-07	F
27660-08	G
*27660-09	H
27660-11	J
27660-13	K
27660-15	L
27660-17	M
27660-19	N
27660-21	P
27660-23	R

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

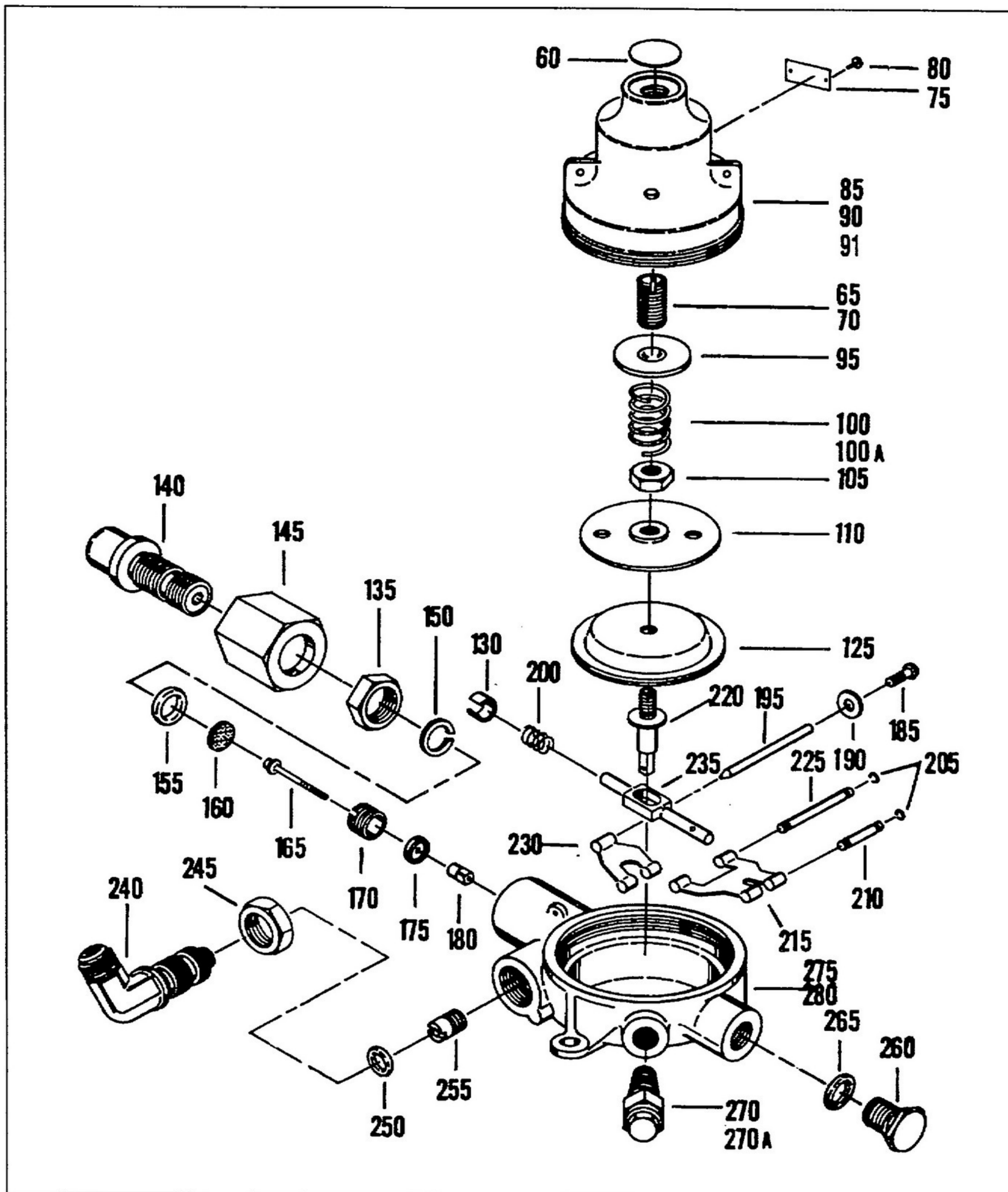


Figure 1 Oxygen Regulator Assembly

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
1- 5	27660-1		(REPLD BY ITEM 5A, EXISTING UNITS IDENTIFIED AS 27660-1 ARE IDENTICAL TO UNITS IDENTIFIED AS 27660-01)		
-5A	27660-01		REGULATOR ASSY-OXYGEN (REPLS ITEM 5)	A	RF
-10	27660-02		REGULATOR ASSEMBLY- OXYGEN	B	RF
-15	27660-3		(REPLD BY ITEM 15A, EXISTING UNITS IDENTIFIED AS 27660-3 ARE IDENTICAL TO UNITS IDENTIFIED AS 27660-03)		
-15A	27660-03		REGULATOR ASSEMBLY- OXYGEN (REPLS ITEM 15)	C	RF
-20	27660-5		(REPLD BY ITEM 20A, EXISTING UNITS IDENTIFIED AS 27660-5 ARE IDENTICAL TO UNITS IDENTIFIED AS 27660-05)		
-20A	27660-05		REGULATOR ASSEMBLY- OXYGEN (REPLS ITEM 20)	D	RF
-25	27660-06		REGULATOR ASSEMBLY- OXYGEN	E	RF
-30	27660-7		(REPLD BY ITEM 30A, EXISTING UNITS IDENTIFIED AS 27660-7 ARE IDENTICAL TO UNITS IDENTIFIED AS 27660-07)		
-30A	27660-07		REGULATOR ASSEMBLY- OXYGEN (REPLS ITEM 30)	F	RF
-35	27660-08		REGULATOR ASSEMBLY- OXYGEN	G	RF
-40	27660-9		(REPLD BY ITEM 40A, EXISTING UNITS IDENTIFIED AS 27660-9 ARE IDENTICAL TO UNITS IDENTIFIED AS 27660-09)		
-40A	27660-09		REGULATOR ASSEMBLY- OXYGEN (REPLS ITEM 40)	H	RF
-45	27660-11		REGULATOR ASSEMBLY- OXYGEN	J	RF
-50	27660-13		REGULATOR ASSEMBLY- OXYGEN	K	RF
-55	27660-15		REGULATOR ASSEMBLY- OXYGEN	L	RF
-56	27660-17		REGULATOR ASSEMBLY-OXYGEN	M	RF
-57	27660-19		REGULATOR ASSEMBLY- OXYGEN	N	RF
-58	27660-21		REGULATOR ASSEMBLY- OXYGEN	P	RF
-59	27660-23		REGULATOR ASSEMBLY- OXYGEN	R	RF
60	27665-00		. NAMEPLATE		1
65	28705L6F14C		. SCREW, SET- OVAL POINT .375-24 UNF × .875 LG (V56878), (SCOTT SCD 58923-00)	A-H, K, L, N, P	1
70	28705L6F12C		. SCREW, SET- OVAL POINT .375-24 UNF × .750 LG (V56878), (SCOTT SCD 59278-00)	J, M, R	1

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
75	27666-01		. PLATE - IDENTIFICATION ATTACHING PARTS		1
80	MS21318-7		. SCREW, DRIVE (P/N CORRECTION) ***		2
85	27662-00		. CAP - REGULATOR (SEE NOTE 2)	A, C, D, F, H-L	1
90	27662-02		. CAP - REGULATOR (SEE NOTE 2)	A-P	1
91	27662-04		. CAP - REGULATOR (SEE NOTE 2)	R	1
95	10340-00		. GUIDE - SPRING		1
100	10272-00		. SPRING, HELICAL - COMPRESSION	A-L, N, P	1
100A	27527-01		. SPRING, HELICAL - COMPRESSION	M, R	1
105	AN315-3		. NUT (SB 35-23)		1
110	10341-00		. PLATE - DIAPHRAGM		1
-115	10344-00		. RING, SLIP (SUPSD BY ITEM 125)	A, C, D, F, H	1
-120	10343-00		. DIAPHRAGM (SUPSD BY ITEM 125)	A, C, D, F, H	1
125	800658-00		. DIAPHRAGM ASSY (SUPSDS ITEMS 115 AND 120)		1
130	10342-00		. SPACER, MARGINAL SPRING		1
135	AN6289C5		. NUT	D, E, M, N, P	1
140	27659-00		. NIPPLE	D, E, M, N, P	1
145	6121P		. NUT, NIPPLE	D, E, M, N, P	1
150	MS9058-05		. RING, BACKUP	D, E, M, N, P	1
155	3-5COMP77-545		. DELETED (SUPSD BY ITEM 155A)		
155A	3-5COMPV747-75		. PACKING, PREFORMED (SUPSDS ITEM 155) - (V83259)	D, E, M, N, P	1
160	10398-00		. FILTER, SCREEN		1
165	10266-00		. VALVE		1
170	10268-00		. RETAINER, SEAT		1
175	10267-03		. SEAT, VALVE		1
180	10265-00		. NUT, ADJUSTING		1
185	18531-00		. SCREW, CAP		1
190	10286-00		. GASKET - PIVOT PIN		1
195	27663-00		. PIN, PIVOT		1
200	10399-00		. SPRING, HELICAL- COMPRESSION		1
205	XRC309		. RING, RETAINING (V76665)		4

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
1 - 210	10348-00		. PIN - TOGGLE		1
215	10349-01		. LINK, TOGGLE - REAR		1
220	27664-00		. LINK - ACTUATOR		1
225	10348-01		. PIN - TOGGLE		1
230	10349-00		. LINK, TOGGLE - FORWARD		1
235	10346-00		. SHAFT, ACTUATOR		1
240	AN833-5D		. ELBOW	D, E, M, N, P	1
245	AN924-5D		. NUT	D, E, M, N, P	1
250	3-5COMP77-545		. DELETED (SUPSD BY ITEM 250A)		
250A	3-5COMPV747-75		. PACKING, PREFORMED (SUPSDS ITEM 250) - (V83259)	D, E, M, N, P	1
255	10282-00		. TUBE, VENTURI		1
260	27924-00		. PLUG		1
265	MS9385-03		. PACKING, PREFORMED		1
270	5081-07		. VALVE, RELIEF	A-L, N, P	1
270A	5081-09		. VALVE, RELIEF	M, R	1
275	27669-03		. BODY ASSEMBLY - REGULATOR (SUPSD BY ITEM 280) (SEE NOTES 1, 2 AND 3)		1
280	27669-05		. BODY ASSEMBLY - REGULATOR (SUPSDS ITEM 275) (SEE NOTES 1, 2 AND 3)		1

- (INFORMATION ONLY) 27669-05 Body Assembly is forged aluminum replacing 27669-03 Body Assembly which is cast aluminum.
- 27662-00 Cap shall be used with 27669-03 Body ONLY.
27662-02 Cap shall be used with 27669-05 Body ONLY.

27662-00 Cap and 27669-03 (CAST) Body were effective on the following 27660 Regulator Assemblies.

27660-1 through SN2633	27660-9 through SN108
27660-3 through SN668	27660-11 through SN147
27660-5 through SN1364	27660-13 through SN103
27660-7 through SN313	27660-15 through SN102

27662-02 Cap and 27669-05 (FORGED) Body are effective on the following 27660 Regulator Assemblies.

27660-1/-01	SN2634 and Subsequent	27660-11	SN 148 and Subsequent
27660-02	SN 101 and Subsequent	27660-13	SN 104 and Subsequent
27660-3/-03	SN 669 and Subsequent	27660-15	SN 103 and Subsequent
27660-5/-05	SN1365 and Subsequent	27660-17	SN 101 and Subsequent
27660-06	SN 101 and Subsequent	27660-19	SN 101 and Subsequent
27660-7/-07	SN 314 and Subsequent	27660-21	SN 101 and Subsequent
27660-08	SN 101 and Subsequent	27660-23	SN 101 and Subsequent
27660-9/-09	SN 109 and Subsequent		

NOTE: Single digit dash configurations (-1, -3, -5, -7 and -9) are identical to the current double digit dash configurations (-01, -03, -05, -07 and -09), respectively.

- No longer available. Use 27669-05 Body Assembly, Item 280, for all overhaul requirements.

- ITEM NOT ILLUSTRATED